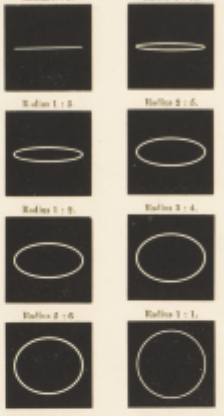
BICIRCLOIDS.

Varieties of Kinematic Bicircloids, the resultants of two circular movements (in the same plane): with the direct or inverse angular-velocity ratio of the Epicycle and Deferent, on which the Curves depend; and their radial-ratios, which determine the various Phases (or changes of Form) of each Curve. The Centric, the Cuspidate, the Orthoidal, Forms of the Curve,—and the other critical cases when the Loops touch,—are the principal Phases of Bicircloids.

2nd Bicircloid—Vel. 1 : 1 dir. or 1 : 2 inv.

3rd Bicircloid—Vel. 2 : 1 inverse.



4th Bicircloid—Vel. 2 : 1 dir. or 2 : 3 inv.

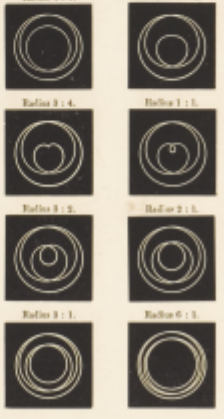
5th Bicircloid—Vel. 1 : 2 dir. or 1 : 3 inv.

6th Bicircloid—Vel. 3 : 1 or 3 : 2 inv.

The First Bicircloid, named the Annuloid or Dactyloid, is a *Circle* representing one external Loop: it is the only Bicircloid that has no variety of Phases. The two circular movements, by turning round their own centers in contrary directions with equal angular velocities, reciprocally counteract each others effect of turning round in space: consequently the resultant motion in a circle in parallel. This is the simplest mode of producing parallel motion in a curve. No other Bicircloidal motion is parallel.

7th Bicircloid—Vel. 3 : 1 dir. or 3 : 4 inv.

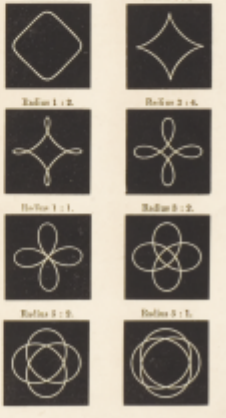
8th Bicircloid—Vel. 1 : 3 dir. or 1 : 4 inv.



9th Bicircloid—Vel. 5 : 2 dir. or 3 : 5 inv.

10th Bicircloid—Vel. 2 : 3 dir. or 2 : 5 inv.

11th Bicircloid—Vel. 4 : 1 or 4 : 3 inv.



All these Curves may be produced by two circular movements (in the same plane) in three ways: viz. either on a fixed plane by a moving point, on a moving plane by a fixed point, or on a moving plane by a moving point. The latter method was adopted for engraving the above specimens; but the same curves may be delineated by Sharp's *Geometric Pen*, or by Imerson's *Geometric Chuck*; which are constructed to produce the same class of Curves by the other two systems.

HENRY PERIGAL, Jun.—6, Carver Wan. Cornhill.—1854.

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